

EDWARD NETTLESHIP, F.R.S.

MR. E. NETTLESHIP, whose death on October 30 we have to deplore, was well known to the public as a distinguished ophthalmic surgeon, and to men of science as an enthusiastic worker on the subject of heredity. He was one of the six sons of Henry John Nettleship, solicitor, of Kettering. Three of his brothers became noted. The eldest, Henry, held the Corpus professorship of Latin at Oxford with great distinction. The second, John Trivett, was well known for his accurate and realistic pictures of wild animals, and was the author of the first serious study of Browning. The youngest, Richard Lewis, was a Fellow of Balliol College, Oxford.

Edward Nettleship was born in 1845, and after a preliminary education at Kettering became a student of the Royal Agricultural College at Cirencester, and of the Royal Veterinary College. Though he qualified as a veterinary surgeon, he soon relinquished that branch, and studied at King's College and the London Hospital Medical Schools, taking the Fellowship of the Royal College of Surgeons of England in 1870. He specialised in ophthalmic surgery at a time when most ophthalmic surgeons still practised general surgery. He was appointed surgeon to the South London Eye Hospital, but his real life-work was carried out at St. Thomas's Hospital and the Moorfields Eye Hospital.

At St. Thomas's Hospital that remarkable personality, Liebreich, who still lives an artistic life in Paris, had laid the foundation of an ophthalmic clinic. Nettleship continued his work, and brought it to a state of perfection previously unequalled in England. At Moorfields he had been assistant to the late Sir Jonathan Hutchinson, where he rivalled his teacher and life-long friend in his enthusiasm for clinical work, and in his abounding inquisitiveness into the mysteries of eye diseases.

Papers full of acute observation and accurately authenticated facts came rapidly and continuously from Nettleship's pen. He thus built up a reputation which ranks with that of the greatest ophthalmic clinicians of the past—Mackenzie of Glasgow, von Graefe of Berlin, and Sir William Bowman of London, the founders of modern clinical ophthalmology. His magnetic personality attracted many of the best students to his side, and he thus founded a tradition for careful observation and accuracy of detail which is being carried on by his successors. He did not suffer fools gladly, and his somewhat brusque manner towards them kept his little band select, whilst it unfortunately aroused some enmity in those who had not the opportunity of testing intimately his sterling character and warm friendliness. He built up a very large private practice, one of his most distinguished patients being Mr. Gladstone, on whom he operated successfully for cataract.

About fifteen years ago Nettleship retired from practice and settled down in his country house at Hindhead. It was not a retirement to ease and luxury, but merely a deviation into scientific work

little less laborious than his earlier work. He devoted himself especially to the study of heredity, and his painstaking and illuminating researches in this subject require no other testimonial than that they were rewarded by the Fellowship of the Royal Society in 1912.

These are his greatest works, but he was full of lively interest in all that pertained to ophthalmology. Much of his time and energy was given up to colour-vision, and he did most valuable service as a member of the departmental committee of the Board of Trade on sight tests for the mercantile marine.

Mr. Nettleship was somewhat reserved, and only those who gained his confidence and learnt to know him well succeeded in penetrating to the fires of friendship which glowed within him. He has passed away, leaving behind him a record of work which lives and will continue to live.

J. HERBERT PARSONS.

NOTES.

At the meeting of the Royal Society of Edinburgh, held on November 3, 1913, the following were elected honorary fellows:—Prof. Horace Lamb, F.R.S., professor of mathematics in the University of Manchester; Sir W. T. Thiselton-Dyer, K.C.M.G., F.R.S., formerly director of the Royal Botanic Gardens, Kew; Dr. G. E. Hale, director of the Mount Wilson Solar Observatory (Carnegie Institution of Washington); Prof. Emil C. Jungfleisch, Mem.Inst.Fr., professor of organic chemistry in the College of France, Paris; Prof. S. Ramón y Cajal, professor of histology and pathological anatomy in the University of Madrid; Prof. V. Volterra, professor of mathematics and physics in the University of Rome; Prof. C. R. Zeiller, Mem.Inst.Fr., professor of plant palæontology in the National Superior School of Mines, Paris.

THE Physical Society's Annual Exhibition will be held on Tuesday, December 16, at the Imperial College of Science, and will be open both in the afternoon and evening.

ANNOUNCEMENT is made from Paris that Prof. Charles Richet, professor of physiology in the University of Paris, and member of the Academy of Medicine, has been awarded the Nobel Prize for science.

THE eighty-eighth Christmas course of juvenile lectures, founded at the Royal Institution in 1826 by Michael Faraday, will be delivered this year by Prof. H. H. Turner, F.R.S., his title being "A Voyage in Space."

THE brain of the late Prince Katsura, which, according to his wishes, has been removed to the Imperial University Museum in Tokio, was found to weigh 1600 grams—the same as that of Kant.

THE death is reported, in his seventy-ninth year, of Dr. P. R. Uhler, an American entomologist and geologist of repute. For three years he was an assistant to Prof. Louis Agassiz, at Harvard, and afterward explored parts of the island of Hayti for him. Since

1862 he had been officially connected with the Peabody Institute, Baltimore. Dr. Uhler was the author of many contributions to scientific journals, and his collection of locusts, presented several years ago to the U.S. Government, was considered one of the best ever made.

THE death is announced, at sixty-seven years of age, of Dr. H. F. Parsons, formerly of the Medical Department of the Local Government Board. An obituary notice in *The Times* reminds us that Dr. Parsons served on many Departmental Committees, including those on water, gas, regulations as to cremation, the work of the Geological Survey, and the medical inspection and feeding of children in public elementary schools. He contributed papers to the Transactions of the Epidemiological Society, of which he became president, and to those of other scientific bodies. He was a fellow of the Geological Society, and among his works were memoranda on the sanitary requirements of cemeteries, disinfection by heat, a report on the influenza epidemic of 1899-90, and an examination of the comparative mortality of English districts.

THE jubilee of the practical realisation of the ammonia-soda process by the chemist, Ernest Solvay, was recently celebrated in Brussels, and was marked by munificent gifts of five million francs for scientific purposes by the veteran inventor, who on the same occasion celebrated his seventy-fifth birthday. The Institute of Applied Chemistry of the faculty of sciences at Paris received 500,000 francs, and the same sum was allotted to the University of Nancy to create a chair of electrotechnics. A fund of 500,000 francs was also put aside for a quadrennial prize to be awarded by the International Congress of Hygiene for researches in transmissible disease. On the occasion of the jubilee, M. Solvay delivered an enthusiastic eulogy of pure science and its results, and made the interesting avowal that the pursuit of science was the *rêve doré de toute sa vie*, and had it not been for the necessity of providing for a family he would probably have taken it up as his profession. On the occasion of this jubilee King Albert honoured M. Solvay by naming him a grand officer of the Order of Leopold.

IMPORTANT proposals for another British Antarctic Expedition, to start next year, are made public by a letter to the Press from Sir Clements Markham, and by Mr. J. F. Stackhouse, who is to lead the expedition. The completion of work in the McMurdo Sound region by the expeditions under Shackleton and Scott directs attention elsewhere in the British section of Antarctica, and Sir Clements Markham regards as one of the next most important problems the investigation of the connection between King Edward VII. Land and Graham Land. It is proposed by Mr. Stackhouse to begin his work at the eastern or Graham Land end of the British quadrant, and to follow the coast, hoping to prove or disprove its continuity, and thus to solve a leading question regarding the physiography of Antarctica in outline. The scheme depends largely upon the incidence of an open season, when the ice-pack leaves a passage along the

coast; Scott himself held the chances of such an opportunity to be good. Financial support is invited, and headquarters for the expedition have been established at Sardinia House, Kingsway, W.C.

THE National Council of Public Morals has established a private commission to inquire into the extent and character of the decline in the birth-rate, its causes, its effects, and its economic and national aspects. This commission is both a strong and representative one, and the fact that Dr. Stevenson, the Superintendent of Statistics for the Registrar-General, and Dr. Newsholme, Medical Officer to the Local Government Board, have joined it gives one confidence that it will be able to obtain and use in an effective manner the best statistical data available to anyone. It will be remembered that these two authorities published in 1906 a paper on the decline in human fertility, which attracted considerable attention. The commission is also to be congratulated on obtaining as members several well-known lady doctors, including Dr. Mary Scharlieb and Dr. Ettie Sayer, who through their professional work have had special opportunity for studying fertility and its absence from the woman's point of view. Economic science, medicine, law, and journalism are all well represented, and the biological aspects of the questions to be discussed will not be forgotten with Mr. Walter Heape to stand for this branch of science. As might perhaps have been expected, the clerical element somewhat predominates. Bishop Boyd-Carpenter is the chairman of the commission, and the Rev. James Marchant the secretary, and there is besides a galaxy of bishops, deans, and well-known preachers. Among these we are glad to find the Dean of St. Paul's, whose sane and broad-minded treatment of such subjects as eugenics has done so much to focus the attention of serious people on them.

The Falmouth Packet of September 17 contains an account of the recent visit of the surveying ship *Carnegie*, of the Carnegie Institution of Washington, in charge of Capt. W. J. Peters. This is the second visit paid by the vessel to Falmouth for the purpose of magnetic observations, the first having been paid four years ago. From Falmouth the *Carnegie* left for New York, whence she set out in June, 1910. The cruise has extended over a large part of the world, calls having been made at, amongst other places, Rio de Janeiro, Cape Town, Colombo, Mauritius, Manila, Fiji, Falkland Islands, and St. Helena. Its geographical position and the presence of a magnetic observatory have in the past rendered Falmouth a specially favourable port for linking up observations on the Atlantic with land observations in western Europe. The discontinuance of magnetic work at Falmouth has been so recent that its usefulness as a base has scarcely as yet been impaired, but in future years unfortunately greater uncertainty will prevail as to the secular change there of the magnetic elements.

THE opening meeting of the Institution of Electrical Engineers for the present session will be held on November 13, when the premiums awarded for papers read or published during the session 1912-13 will be

presented, and an address on pressure rises will be given by Mr. W. Duddell, F.R.S., the president of the institution. In the list of papers to be read at meetings during the first half of the session we notice one by Mr. H. R. Speyer on the development of electric power for industrial purposes in India. The papers in preparation for the second half of the session are to deal largely with electric traction, and great prominence is to be given to the general question of the electrification of railways. The fifth Kelvin lecture is to be delivered by Sir Oliver Lodge on January 22, 1914. Much of the good work accomplished by the institution is done by the local sections, which meet regularly. The local branches which have been inaugurated up to the present are the Birmingham, Dublin, Manchester, Newcastle, Scottish, Western, and Yorkshire Sections. The Newcastle Section sometimes meets at Newcastle, and sometimes at Middlesbrough; the Scottish alternately at Glasgow and Edinburgh; the Western alternately at Bristol and Cardiff, and the Yorkshire Section at Leeds.

THE Natal Sugar Growers' Association has for some time past been in communication with the Durban Technical Institute with the view of establishing a sugar school, the aim of which would be to prepare young men for the technical control and investigation of the manufacture of cane-sugar. The original scheme was to establish three lectureships—in chemistry, bacteriology, and entomology respectively. These, together with the lectureships already in existence, would supply a good technical training. The three specialists appointed would also conduct research in connection with the processes of manufacture and growth of cane-sugar. A wide field is open in this direction. There are problems in the sugar-house awaiting solution which are of great interest in themselves, and the solution of which will be of prime importance to the sugar industry, as something like 20 per cent. of the available sugar is at present lost. In this field it is hoped that the specialists will do pioneer work. Two lecturers—one in the chemistry and one in the bacteriology of cane-sugar—are soon to be appointed, the appointments in the first instance to be for three years at a salary of 400*l.* per annum in each case. Applications should be sent to Mr. B. M. Narbeth, principal of the Durban Technical Institute, Durban, Natal.

GUSTAF ISAK KOLTHOFF, who died on October 26, in his sixty-eighth year, had considerable reputation as a scientific hunter and as a pioneer in the realistic methods of exhibiting natural groups of animals in Museums. His chief monument is the large cyclorama at Stockholm, known as the Biological Museum, in which, with the assistance of the Swedish artist, Bruno Liljefors, he has presented the Swedish vertebrate fauna under the successive conditions of spring, summer, autumn, and winter. A small, but perhaps more genuinely instructive example of his work in this direction is the Biological Museum at the University of Upsala, in which University he was appointed zoological curator so long ago as 1878. In addition to these and to the museum which, about 1865, he created in the boys' school at Skara, near his own

home, Kolthoff was responsible for the installation of six other collections of Swedish mammals and birds in various places in Sweden. He was without scientific training of the academic kind, and picked up the technique of his profession while still a youth in the workshops of the State Zoological Museum. By his own study, however, he became a skilled practical ornithologist and entomologist, and in that capacity accompanied Baron A. E. Nordenskjöld's expeditions to Greenland in 1883 and 1887. He also joined Prof. A. G. Nathorst on his voyages to Beeren Island, Spitsbergen, and King Karl's Land. In 1890 he himself led an expedition to Spitsbergen and north-east Greenland. In addition to many popular accounts of his travels, he was responsible, together with Dr. L. Jägerskiöld, for a work entitled "Birds of the North," which appeared during the years 1895 to 1899. In 1907, at the Linnean festival, he received from the University of Upsala the honorary degree of doctor of philosophy.

In the Transactions of the Hull Scientific Field Naturalists' Club (vol. iv., Part 5), Mr. T. Sheppard describes the excavation of an Anglo-Saxon cemetery at Hornsea, the objects obtained having been deposited in the Hull Museum. Some of the corpses were buried in the crouched position, which seems to be a not unusual feature in Anglo-Saxon interments in east Yorkshire. Among the "finds" is a series of bronze brooches, similar to examples found in Norway, with very naturalistic representations of horse heads. A bell formed of very thin metal is, from comparison with an example from Papcastle, Cumberland, now in the British Museum, assigned to the Roman period. The "food vases" found are interesting because they are unlike the typical Anglo-Saxon cinerary urns, being quite plain, without any trace of ornamentation, and very similar to ordinary domestic utensils. They evidently contained food when placed with the burials.

In the October number of *Science Progress* Mr. A. G. Thacker contributes an interesting article on the significance of the Piltdown discovery. The era of *Homo sapiens*, he states, should include the Aurignacian epoch and all that comes after; before that epoch we are among kindred but unfamiliar creatures. He suggests, therefore, that the Aurignacian and three subsequent ages should be classed as Deutolithic, and the previous epochs grouped as Protolithic. A discussion follows of the possible relationships of *Pithecanthropus erectus*, the Java ape-man; *Homo heidelbergensis*, the Heidelberg man; *Eoanthropus dawsoni*, the Piltdown woman; *Homo neandertalensis* or *Homo primigenius*, the Neanderthal man of Acheulian and Mousterian times; and *Homo sapiens*, garrulous man. "The power of speech was a crying need of the advancing primates . . . it was language that transformed the horde into the tribe. The creatures were probably widely dispersed on the earth, whilst they were yet speechless . . . rudimentary powers of speech may thus have been acquired independently by more than one species; and this, not blood-relationship, may have been the explanation of the man-like

symphysis of the Heidelberg jaw." On this hypothesis the common ancestor is conceived as possessing a simian mandibular symphysis, a massive jaw, large teeth, and probably a low forehead. From this ancestor the Heidelberg and Piltdown types may have come along diverging branches; the former leading up to Neanderthal man, the latter to *H. sapiens*. The author is strongly inclined to think that both the apes and Pithecanthropus have a low forehead, not because they are degenerate, but because they are immediately descended from monkeys. And even in its more plausible application to Neanderthal man, he views the degeneracy theory with considerable suspicion.

UNTIL quite recently holothurians (sea-cucumbers) were known from the older rocks merely by their hard spicules and plates, which were long ago identified in the Scottish Carboniferous. From certain very fine-grained Middle Cambrian beds in British Columbia there have, however, been obtained impressions of soft-bodied organisms which Dr. C. H. Walcott (Smithson. Miscell. Collect., vol. lvii., No. 3) identified as holothurians, under the generic names of Eldonia, Loggania, Louisella, and Mackenzia. But his determination was not suffered to pass without criticism, and in *Science* of February 16, 1912, Dr. Lyman Clark expressed very strong doubts as to whether any of these genera are really holothurian, stating confidently that Eldonia is not. These criticisms are discussed in the August number of *The American Naturalist* by Mr. Austin Clark, who arrives at the conclusion that, with the exception of Mackenzia, which is regarded as a zoantharian, the original identification is correct, two of the genera being assigned to the existing deep-sea family Elpidiidae, while the third (Eldonia) represents an allied pelagic family. In bodily form the last-named type recalls a medusa, but the resemblance may probably be regarded as a parallel adaptation to a free-swimming existence.

In the October number of *Bedrock*, Prof. Poulton replies to Prof. Punnett's criticism of the theory of mimicry in the July number of the same review. After pointing out that de Vries himself holds that small variations may be inherited and selected, he brings instances to show that such transmission does actually occur. The case of *Acraea alciope* is adduced as demonstrating that an incipient mimetic feature may arise as an occasional variation in one part of the area inhabited by a given species, which feature may be further developed in distinctness, and in the relative number of individuals possessing it, in the presence of a distasteful model occupying another part of the range of the mimicking species. These facts, it is contended, support the conclusion that "the mimetic pattern was attained by steps and not suddenly." A more elaborate instance is afforded by *Papilio polytes*, with its two mimetic females. Here, apparently, the pigments of mimic and model have different genetic antecedents. By a detailed analysis of the patterns of the forms in question, and by a comparison of their numerical relation with the non-mimetic form

in regions where the respective models are present, rare, or absent, Prof. Poulton arrives at the conclusion that these forms have been derived from the ancestral condition by gradual stages, and that his opponent is not justified in the statement that natural selection is non-existent in so far as concerns the comparative numbers of the mimetic and non-mimetic females of this species.

The Scientific American for October 18 contains an article on earthquakes and the Panama Canal, by Mr. D. F. MacDonald, geologist to the Isthmian Canal Commission. The recent occurrence of two earthquakes in the Isthmian zone has directed attention to a subject that might be of considerable importance with regard to the safety of the canal works. Mr. MacDonald, however, concludes that little danger is to be feared from earthquake disturbances (see *NATURE*, vol. xcii., p. 174), and he gives two main reasons for his view. The first is connected with the geological structure of the isthmus. Though numerous small faults along the course traversed show that readjustments of the crust have taken place in times past, the district is one from which high mountains and all evidences of recent displacement are alike absent. Again, though a large number of tremors are recorded every month by the Bosch-Omori seismograph at Ancon, the isthmus is entirely free from serious earthquakes. The seismic record of the isthmus dates from the Spanish conquest, and during more than three centuries there have been only two earthquakes of any consequence. One in 1621 destroyed many buildings in Panama, while another in 1882 damaged several buildings and bridges, and in places threw the railway track out of alignment. But neither of these shocks, it is probable, would have damaged seriously even the most delicate parts of the canal.

To *Symons's Meteorological Magazine* for October Mr. R. C. Mossman contributes an article on correlations at St. Helena, the fifth of these interesting investigations. The results are not considered as conclusive, but some suggestive resemblances and contrasts have been disclosed. During the years 1893-1903 there was an undoubted relation between the rainfall in the vicinity of Fort William from January to March, and the mean temperature at St. Helena for the months May to August following, but from 1904-11 the correlation breaks down. A relation could also be traced between the mean temperature at St. Helena during January to April and the mean barometric pressure at Punta Arenas (Magellan Straits) during the four months following, but during the last six years (1906-11) the results, for reasons given, were not very conclusive. With respect to temperature at St. Helena and rainfall at Mexico City, the curves pursued the same course from 1892 to 1898, while from 1899 to 1909 they were the reverse of each other. It will probably be remembered that Dr. W. N. Shaw pointed out (*NATURE*, December 21, 1905, "The Pulse of the Atmospheric Circulation") an apparent connection between the seasonal variation of wind-force at St. Helena and the rainfall in the south of England.

VOL. x. of "Contributions from the Jefferson Physical Laboratory of Harvard University" consists of reprints of eleven papers on physical subjects which appeared during 1912 in the Proceedings of the American Academy, *The Philosophical Magazine*, *The Astrophysical Journal*, and our own columns. The researches described have been aided by the Rumford fund of the American Academy, the Bache fund of the National Academy, and the Thomas Jefferson Coolidge fund of the University. More than half the volume is occupied by the researches of Dr. P. W. Bridgman on the thermodynamic properties of liquids at high pressures. To this work, which takes its place as one of the classics in this field, we have directed our readers' attention, as it has been published. Other important papers are those by Profs. Pierce and Evans showing that carborundum crystals possess electrostatic capacity owing to the alternation of insulating and conducting strata within them, by Profs. Kennelly and Pierce, showing how the motion of the diaphragms of telephone receivers affect the impedances of the instruments, and by Prof. Peirce on the maximum magnetisation in iron, to which we referred in our issue for July 24. From this list of first-class work it will be seen that Harvard is not one of those universities which overlooks its duty of increasing knowledge in its anxiety to impart knowledge and test it by examination.

THE enzymic activity of the sap of a number of vegetables such as cabbage, onions, ginger, and radishes has been investigated by T. Tadokoro, and the results published in a contribution to the Journal of the College of Agriculture, Tohoku University, vol. v., part 2. The capacity of the sap to induce certain enzymic changes appears to vary widely with the plant, peptolytic action being more pronounced in the case of onions and ginger than in the other six plants studied. Diastase was detected in every case with the exception of onions, and urease was present in ginger and yam-roots, although not to any great extent. Catalase and oxydase action was obtained with each sap, but the power to hydrolyse amygdalin and salicin was confined to that of the yam and cabbages.

At a meeting of the Institute of Chemistry on October 29, the first of two lectures was delivered by Mr. W. P. Dreaper on the research chemist in the works, with special reference to the textile industry. The total gross value in 1907 of the textile materials and fabrics manufactured in the United Kingdom amounted to 333,000,000*l.*, and 1,253,000 persons were employed in their manipulation. On a basis of one chemist for every 2000 persons employed, no fewer than 600 chemists should be utilised in this industry alone, each of whom would deal with an annual gross output valued at more than 500,000*l.* One large aniline dye combine on the Continent already employs 700 chemists. The lecturer insisted that the industrial chemist who remains in his laboratory is lost. Knowledge of chemistry alone is an insufficient equipment; modern research requires a knowledge of physics and the power to apply it. The work of the

textile chemist was considered in detail, and specially illustrated by reference to the developments in mercerising and schreinerling. The chemist working under industrial conditions at once realises the success achieved by the "rule-of-thumb" man in the past; by systematically studying his methods and seeking to discover points he has not fully realised the chemist may often be able to improve upon them. The nature of the methods and machinery used for producing artificial fibres, and more recently artificial fabrics were reviewed. In conclusion the lecturer dealt with the influence of theory and the chemist's work on actual industrial operations.

MESSRS. A. GALLenkAMP AND CO.'s new catalogue (section 1, part iii.), recently issued, deals mainly with the requirements of engineering chemistry. Fuel calorimeters of all descriptions are dealt with very fully, a special feature being a full description of the method of using each of the better known types of instrument. Gas calorimeters are also well represented, including two self-recording types. Five types of CO₂ recorders are illustrated, including all the instruments in common use, and this is supplemented by apparatus for draught measurement and flue gas analysis. The section dealing with oil testing includes viscosimeters, both the flow and friction types, flash-point and distillation apparatus. Apparatus for iron and steel analysis includes an electric tube furnace, apparatus for the determination of carbon by the wet combustion process, and for the estimation of arsenic, phosphorus, and sulphur. The last quarter of the catalogue is devoted to pyrometers; this includes instruments of every type. The principles utilised in the various instruments and their mode of use are briefly but accurately summarised.

WE learn from *The Builder* for October 31 that the Liverpool Corporation has held recently a competition for a sanatorium of phthisis patients. This is one of the first municipal sanatoriums to be tackled by the architectural profession, and it was extraordinary to note the great diversity of planning shown by the thirty-one sets of designs submitted. Tuberculosis sanatorium planning is as yet in its infancy, and this fact accounts for these differences in treatment. It is probable that we shall not arrive at anything like a standard type until several have been built and their actual working arrangements tested. The first premium was awarded to Messrs. T. R. and V. Hooper, of Redhill. In their design, nearly all the blocks are isolated, with the exception of the actual wards; these are combined into one long wing. The children's wards are separate, and comprise practically a small self-contained sanatorium; this block is particularly good, and forms a one-storey bungalow. There is a good deal to be said in favour of aiming at a cheerful collegiate-like character in such a building, rather than going on the lines of the regular and somewhat dreary infirmary type, and this is perhaps the best feature in favour of Messrs. Hooper's design.

THREE new volumes in Messrs. T. C. and E. C. Jack's compact little series, "The People's Books," have recently reached us; and they merit a word or

two of description in addition to the announcement of their publication, in our weekly list of books received. Mr. E. W. Maunder contributes a popular account of astrophysics in a volume having the title, "Sir William Huggins and Spectroscopic Astronomy." Dr. W. D. Henderson has written a volume on "Biology," in which he gives in language as free from technicalities as possible, a broad account of the main facts of the science of life; and Mr. J. Arthur Hill writes with dignity and philosophic power upon the subject of "Spiritualism and Psychical Research." Each volume contains about 96 pp., and is published at the price of 6d. net.

OUR ASTRONOMICAL COLUMN.

COMET NEWS.—The latest comet discovered, namely 1913e, (Zinner), has been identified as a return of 1900 III. (Giacobini), so that it has made two revolutions since its original discovery, the period being 6.435 years. Being of about the tenth magnitude and its declination a large southerly one, namely, greater than 19° , it is not a favourable object for observers in high northern latitudes. An ephemeris extending to November 14 is given in *Astronomische Nachrichten*, No. 4690.

Herr T. Banachiewicz, as *Astronomische Nachrichten*, No. 4689, states, reported a light change in comet 1913c (Neujmin) on October 6, while on October 8 the comet could no longer be seen. Dr. Graff also looked for the comet in vain.

Writing to the *Astronomische Nachrichten*, No. 4690, on September 11, Prof. Barnard describes an unusual appearance of this comet on September 9. He at first thought that a small star was involved in the north preceding side of the comet, but further observation indicated that the star was travelling with the comet; in fact, it was the nucleus. Using the 40-in. and a power of 460 the nucleus was still stellar, but with 700 it became ill-defined and not so readily taken for a star. He concludes in the following words:—"The nucleus was estimated to be 11.5 magnitude. It was so clear cut and distinctly star-like that one would not for a moment have suspected any real connection with the faint nebulosity apparently attached to it south following. I have not before seen such a striking case of a comet being essentially all nucleus."

Comet 1913d (Westphal) does not gain in brightness, as was anticipated, in spite of its distance from the sun being reduced. The following is a continuation of the ephemeris printed in *Astronomische Nachrichten*, No. 4687:—

12h. M.T. Berlin.

			R.A. (true)			Dec. (true)			Mag.	
			h.	m.	s.					
Nov.	6	...	20	35	17	...	+ 27	27.5	...	8.6
	7	...		34	46	...	28	2.0		
	8	...		34	18	...	28	36.1		
	9	...		33	54	...	29	9.9	...	8.6
	10	...		33	32	...	29	43.4		
	11	...		33	14	...	30	16.7		
	12	...		33	0	...	30	49.8		
	13	...	20	32	48	...	+ 31	22.6	...	8.7

According to Miss S. M. Levy, of Berkeley, California, the above ephemeris reads about 23 seconds too great in R.A., and about 3.4' too small in declination for November 13. During the current week the comet passes from Vulpecula into Cygnus, and is in a good position for observation.

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SPECTRA OBTAINED BY MEANS OF THE TUBE-ARC.—Another important spectroscopic research has just been published by Prof. A. S. King (Contributions from the Mount Wilson Solar Observatory, No. 73), who has been studying the relation of the arc and spark lines by means of a tube-arc. In this paper he presents in some detail the leading features of the spectrum of this form of arc, and by a comparison with other sources he infers the probable character of the radiation involved. The results discussed and finely illustrated are based on fifty plates taken with instruments of different degrees of dispersion. This paper follows the one described in this journal in July last (Vol. xci., p. 541), and the main results of the inquiry may be briefly summarised as follows:—In the study of the tube-arc spectrum a region near the centre of the tube's cross-section was found to give the hydrogen spectrum and the enhanced lines of metals most strongly, with some variation among different elements as to how rapidly their enhanced lines diminish in intensity towards the wall. The arc lines of two groups of elements, represented by iron and calcium, show different degrees of response to the conditions most favourable for enhanced lines. The arc lines of titanium and vanadium differ from those of the other elements studied, as they show their greatest strength close to the wall. On the question of dissymmetry of lines produced in the central part of the tube, the dissymmetry is usually towards the red, but some lines show little or no effect. In the cases of $\lambda 4481$ (Mg.) and $\lambda 4267$ (C.) the dissymmetry is explained by the observation that both these lines are double. Tests on the ionisation of the vapour and on its conductivity compared to that of the tube material, together with the spectroscopic phenomena of the tube arc, indicate that the effects may largely be due to the impact of electrons emitted by the highly heated carbon, the resultant effect of these impacts becoming stronger near the centre of the tube.

KODAIKANAL PROMINENCE OBSERVATIONS AND DISCUSSIONS.—Two bulletins, Nos. 31 and 33, of the Kodaikanal Observatory, have come to hand dealing with the routine observations of prominences and a discussion of past data. No. 31, by the director, Mr. J. Evershed, is confined to the summary of prominence observations for the first half of the present year. Compared with the previous six months the mean frequency remained practically unaltered, while the mean height slightly increased, and the mean extent somewhat diminished. The eastern limb showed a slight preponderance in numbers and areas over the western. Only five metallic prominences were observed. Other observations recorded include the displacements of the hydrogen lines, prominences projected on the disc as absorption markings, &c.

Bulletin No. 33 is written by the assistant-director, Mr. T. Royds, and deals with prominence periodicities, the investigation being a construction of the periodograms of prominences in the same way, as Schuster investigated the sun-spot data. Mr. Royds confined the Kodaikanal data to the years 1905-1912, and determined the mean daily areas by dividing the total prominence areas for each month by the effective number of days of observation in each month. The prominence periodogram finally obtained displayed the presence of three periods of large intensity, two nearly homogeneous, of $6\frac{1}{2}$ and $7\frac{1}{2}$ months, and the third, provisionally fixed at $13\frac{1}{2}$ months, the highest of the band. The mean daily frequencies for each month from the year 1881 to 1912, deduced from observations at Palermo and Catania, were similarly analysed, as a check, and they indicate distinct peaks at the same points as the Kodaikanal curve. The amplitudes of these short periods in